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1. In a network system including a server system, a client system, and one or  
2 more other network devices, wherein the server system monitors the occurrence of events,  
3 sends notification data to the client system, when notification has been requested, after one  
4 of the monitored events occurs, and may have client data requiring transmission to the  
5 client system, a method for efficiently sending notification to the client system when the  
6 event has occurred, so as to preserve the processing capacity of the server system and the  
7 client system, and so as to preserve bandwidth on the network system, the method  
8 comprising:

9       an act of the server system determining that a notification is to be sent to the  
10 client system upon the occurrence of one of the monitored events;

11       an act of the server system sending notification data using a connectionless  
12 protocol to the client system, if one of the monitored events occurs;

13       an act of the server system attempting to receive contact from the client  
14 device using a connection-oriented protocol when the server system has client data  
15 to transmit to the client system; and

16       an act of the server system transmitting the client data to the client system  
17 using the connection-oriented protocol, after the server system receives contact  
18 using the connection-oriented protocol.

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20       2. A method as recited in claim 1 wherein the server system determines that a  
21 notification is to be sent to the client system by receiving a message from the client system.

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23       3. A method as recited in claim 1 wherein the server system monitors for the  
24 occurrence of events by executing separate modules to monitor individual events.

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2 4. A method as recited in claim 1 wherein in the connectionless protocol is

3 User Datagram Protocol.

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5 5. A method as recited in claim 1 wherein the notification data further  
6 comprises data that notifies the client system that the server has additional data associated  
7 with the occurrence of the event.

8  
9 6. A method as recited in claim 1 wherein the connection-oriented protocol is  
10 Transmission Control Protocol.

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In a network system including a server system, a client system, and one or  
2 more other network devices, wherein the server system monitors the occurrence of events,  
3 sends notification data to the client system, when notification has been requested, after one  
4 of the monitored events occurs, and may have client data requiring transmission to the  
5 client system, a method for efficiently sending notification to the client system when the  
6 event has occurred, so as to preserve the processing capacity of the server system and the  
7 client system, and so as to preserve bandwidth on the network system, the method  
8 comprising:

- 9           an act of the server system determining that a notification is to be sent to the  
10 client system upon the occurrence of one of the monitored events;
- 11           an act of the server system sending notification data using a connectionless  
12 protocol to the client system, if one of the monitored events occurs; and
- 13           a step for sending client data, after the notification data is sent, to the client  
14 system using a connection-oriented protocol.

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1       8. A computer program product for implementing, in a network system  
2 including a server system, a client system, and one or more other network devices, wherein  
3 the server system monitors the occurrence of events, sends notification data to the client  
4 system, when notification has been requested, after one of the monitored events occurs,  
5 and may have client data requiring transmission to the client system, a method for  
6 efficiently sending notification to the client system when the event has occurred, so as to  
7 preserve the processing capacity of the server system and the client system, and so as to  
8 preserve bandwidth on the network system, the computer product comprising:

9             a computer-readable medium carrying computer-executable instructions  
10          that, when executed at the server system, cause the server system to perform the  
11          following:

12                 an act of causing the server system to determine that a notification is  
13          to be sent to the client system upon the occurrence of one of the monitored  
14          events;

15                 an act of causing the server system to send notification data using a  
16          connectionless protocol to the client system, if one of the monitored events  
17          occurs;

18                 an act of causing the server system to attempt to receive contact  
19          from the client system using a connection-oriented protocol when the server  
20          system has client data to transmit to the client system; and

21                 an act of causing the server system to transmit the client data to  
22          client system using the connection-oriented protocol, after the server system  
23          receives contact using the connection-oriented protocol.

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1           9. A computer program product for implementing, in a network system  
2 including a server system, a client system, and one or more other network devices, wherein  
3 the server system monitors the occurrence of events, sends notification data to the client  
4 system, when notification has been requested, after one of the monitored events occurs,  
5 and may have client data requiring transmission to the client system, a method for  
6 efficiently sending notification to the client system when the event has occurred, so as to  
7 preserve the processing capacity of the server system and the client system, and so as to  
8 preserve bandwidth on the network system, the computer product comprising:

9                 a computer-readable medium carrying computer-executable instructions  
10                 that, when executed at the server system, cause the server system to perform the  
11                 following:

12                         an act of causing the server system to determine that a notification is  
13                 to be sent to the client system upon the occurrence of one of the monitored  
14                 events;

15                         an act of causing the server system to send notification data using a  
16                 connectionless protocol to the client system, if one of the monitored events  
17                 occurs; and

18                         a step for causing the server system to send client data, after the  
19                 notification data is sent, to the one of the plurality of client systems using a  
20                 connection-oriented protocol.

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10. In a network system including a server system and a client system, wherein  
the server system monitors the occurrence of events and sends notification data to the  
client system when one of the monitored events occurs and wherein the client system  
attempts to establish a communication link to the server system using a connection-  
oriented protocol, after the client system receives event notification from the server system,  
when the server system needs to send additional data to the client system, a method for the  
server system to repeatedly attempt notification of the client system so as to preserve the  
processing capacity of the server system and the client system, and so as to preserve  
bandwidth on the network system, the method comprising:

10                   an act of the server system determining that a notification is to be sent to the  
11                   client system upon the occurrence of one of the monitored events;

12                   an act of the server system sending notification data to the client system  
13                   using a connectionless protocol to notify the client system of the occurrence of a  
14                   monitored; and

15                   an act of the server system resending the notification data using a  
16                   connectionless protocol to the client system at time intervals which, at least for a  
17                   time, increase after each failure to detect the establishment of a communication link  
18                   using a connection-oriented protocol from the client system, wherein the resending  
19                   occurs until a communication link using a connection-oriented protocol is  
20                   established from the client system or until a timeout period has elapsed; and

21                   an act of the server system sending additional data to the client system if a  
22                   communication link using a connection-oriented protocol is established.

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1. A method as recited in claim 10 wherein the server system determines that notification is to be sent to the client system by receiving a message from the client system.
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  4. 12. A method as recited in claim 10, wherein the server system monitors for the occurrence of events by executing separate modules to monitor individual events.
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  - 6.
  7. 13. A method as recited in claim 10, wherein the connectionless protocol is User Datagram Protocol.
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  - 9.
  10. 14. A method as recited in claim 10, wherein the time interval doubles after each successive failure to establish communication.
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  - 12.
  13. 15. A method as recited in claim 10, wherein the connection-oriented protocol is Transmission Control Protocol.
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1 16. In a network system including a server system and a client system, wherein  
2 the server system monitors the occurrence of events and sends notification data to the  
3 client system when one of the monitored events occurs and wherein the client system  
4 establishes a communication link to the server system using a connection-oriented  
5 protocol, after the client system receives event notification from the server system, when  
6 the server system needs to send additional data to the client system, a method for the server  
7 system to repeatedly attempt notification of the client system so as to preserve the  
8 processing capacity of the server system and the client system, and so as to preserve  
9 bandwidth on the network system, the method comprising:

10 an act of the server system determining that a notification is to be sent the  
11 client system upon the occurrence of one of the monitored events;

12 a step for the server system resending notification data, using a  
13 connectionless protocol, to the client system at predefined time intervals which, at  
14 least for a time, increase, in an attempt to notify the client system a monitored event  
15 has occurred and a communications link can be received from the client system  
16 using a connection-oriented protocol; and

17 an act of the server system sending additional data to the client system if a  
18 communication link using a connection-oriented protocol is established.

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17. A computer program product for implementing, in a network system  
1 including a server system and a client system, wherein the server system monitors the  
2 occurrence of events and sends notification data to the client system when one of the  
3 monitored events occurs and wherein the client system establishes a communication link to  
4 the server system using a connection-oriented protocol, after the client system receives  
5 event notification from the server system, when the server system needs to send additional  
6 data to the client system, a method for the server system to repeatedly attempt notification  
7 of the client system so as to preserve the processing capacity of the server system and the  
8 client system, and so as to preserve bandwidth on the network system, the computer  
9 product comprising:

11                   a computer-readable medium carrying computer-executable instructions  
12                   that, when executed at the server system, cause the server system to perform the  
13                   following:

14                   an act of determining that a notification is to be sent to the client  
15                   system upon the occurrence of one of the monitored events;

16                   an act of sending notification data the client system using a  
17                   connectionless protocol to notify the client system of the occurrence of a  
18                   monitored event and;

19                   an act of resending the notification data using a connectionless  
20                   protocol to the client system at time intervals which, at least for a time,  
21                   increase after each failure to detect the establishment of a communication  
22                   link using a connection-oriented protocol from the client system, wherein  
23                   the resending occurs until a communication link using a connection-

1 CIV A 7 oriented protocol is established from the client system or until a timeout  
2 period has elapsed; and  
3 an act of sending additional data to the client system if a  
4 communication link using a connection-oriented protocol is established.

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A computer program product for implementing, in a network system including a server system and a client system, wherein the server system monitors the occurrence of events and sends notification data to the client system when one of the monitored events occurs and wherein the client system establishes a communication link to the server system using a connection-oriented protocol, after the client system receives event notification from the server system, when the server system needs to send additional data to the client system, a method for the server system to repeatedly attempt notification of the client system so as to preserve the processing capacity of the server system and the client system, and so as to preserve bandwidth on the network system, the computer product comprising:

a computer-readable medium carrying computer-executable instructions that, when executed at the server system, cause the server system to perform the following:

an act of determining that a notification is to be sent to the client system upon the occurrence of one of the monitored events;

a step for resending notification data to the client system at time intervals which, at least for a time, increase, using a connectionless protocol in an attempt to notify the client system a monitored event has occurred and a communications link can be received using a connection-oriented protocol; and

an act of sending additional data to the client system if a communication link using a connection-oriented protocol is established.

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1           19. In a network system including a server system and a plurality of client  
2 systems, wherein individual client systems from among the plurality client systems can  
3 request notification of the occurrence of one or more of a plurality of events and wherein  
4 the server system monitors to determine if any of a plurality of events has occurred and  
5 wherein the server system must send notification to individual client systems for every one  
6 of the plurality of events that occurs for which individual client systems have requested  
7 notification, a method for efficiently notifying one of the plurality of client systems of the  
8 occurrence of more than one event from among the plurality of events so as to preserve the  
9 processing capacity of the server system and the plurality of client systems, and so as to  
10 preserve bandwidth on the network system, the method comprising:

11                 an act of the server system determining that a notification is to be sent to  
12 each individual client system from among the plurality of client systems that  
13 requested notification of the occurrence of one of the monitored events;

14                 an act of the server system associating a separate storage location with each  
15 client and using the separate storage locations to store data on the occurrence of  
16 events which must be sent to each of the associated clients;

17                 an act of server system appending to the separate storage locations the  
18 occurrence of successive events requested by individual client systems in order to  
19 save a record of the occurrence of the events until notification is ready to be sent to  
20 the individual client systems of the occurrence of all the saved events; and

21                 an act of the server system using a connectionless protocol to send  
22 separately stored data to one of the plurality of client systems in order to attempt to  
23 simultaneously notify the one of the plurality of client systems of the occurrence of  
24 all the events for which the one of the plurality of clients has requested notification.

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20. A method as recited in claim 19 wherein the separate storage locations are included on one or more mass storages device associated with the server system.
  21. A method as recited in claim 19 wherein the server system monitoring for the occurrence of events comprises executing separate modules to monitor individual events.
  22. A method as recited in claim 19 wherein the connectionless protocol is User Datagram Protocol.
  23. A method as recited in claim 22 wherein the simultaneous notification comprises receipt of one User Datagram Protocol packet.

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24. In a network system including a server system and a plurality of client  
systems, wherein individual client systems from among the plurality of client systems can  
request notification of the occurrence of one or more of a plurality of events and wherein  
the server system monitors to determine if any of a plurality of events has occurred and  
wherein the server system must send notification to individual client systems for every one  
of the plurality of events that occurs for which the individual client systems have requested  
notification, a method for efficiently notifying an individual client system of the  
occurrence of more than one event from among the plurality of events so as to preserve the  
processing capacity of the server system and the plurality of client systems, and so as to  
preserve bandwidth on the network system, the method comprising:

an act of the server system determining that a notification is to be sent to  
each individual client system from among the plurality of client systems that  
requested notification of the occurrence of one of the monitored events;

a step for the server system to separately store, for each of the plurality of  
client systems, data relating to the occurrence of the events for which each of the  
plurality of client systems requested notification;

an act of the server system using a connectionless protocol to send  
separately stored data to one of the plurality of client systems in order to attempt to  
simultaneously notify the one of the plurality of client systems of the occurrence of  
all the events for which the one of the plurality of clients has requested notification.

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25. A computer program product for implementing, in a network system  
1 including a server system and a plurality of client systems, wherein individual client  
2 systems from among the plurality client systems can request notification of the occurrence  
3 of one or more of a plurality of events and wherein the server system monitors to  
4 determine if any of a plurality of events has occurred and wherein the server system must  
5 send notification to individual client systems for every one of the plurality of events that  
6 occurs for which individual client systems have requested notification, a method for  
7 efficiently notifying one of the plurality of client systems of the occurrence of more than  
8 one event from among the plurality of events so as to preserve the processing capacity of  
9 the server system and the plurality of client systems, and so as to preserve bandwidth on  
10 the network system, the computer product comprising:  
11

12           a computer-readable medium carrying computer-readable instructions, that  
13           when executed at the server system, cause the server system to perform the  
14           following:

15           an act of determining that a notification is to be sent to each  
16           individual client system from among the plurality of client systems that  
17           requested notification of the occurrence of one of the monitored events;

18           an act of associating a separate storage location with each client  
19           system, the server system using the separate storage locations to store data  
20           on the occurrence of events which must be sent to each of the client  
21           systems;

22           an act of appending to the separate storage locations the occurrence  
23           of successive events requested by individual client systems in order to save  
24           a record of the occurrence of the events until the server system is ready to

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send notification to the individual client systems of the occurrence of all the saved events; and

an act of using a connectionless protocol to send the contents of one of the separate storage locations to the client system associated with the one of the separate storage locations in order to attempt to simultaneously notify the associated individual client system of the occurrence of all the events stored in the separate storage location.

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26. A computer program product for implementing, in a network system  
1 including a server system and a plurality of client systems, wherein individual client  
2 systems from among the plurality client systems can request notification of the occurrence  
3 of one or more of a plurality of events and wherein the server system monitors to  
4 determine if any of a plurality of events has occurred and wherein the server system must  
5 send notification to individual client systems for every one of the plurality of events that  
6 occurs for which individual client systems have requested notification, a method for  
7 efficiently notifying one of the plurality of client systems of the occurrence of more than  
8 one event from among the plurality of events so as to preserve the processing capacity of  
9 the server system and the plurality of client systems, and so as to preserve bandwidth on  
10 the network system, the computer product comprising:  
11

12           a computer-readable medium carrying computer-readable instructions, that  
13           when executed at the server system, cause the server system to perform the  
14           following:

15           an act of determining that a notification is to be sent to each  
16           individual client system from among the plurality of client systems that  
17           requested notification of the occurrence of one of the monitored events;

18           a step for separately storing for each of the plurality of client  
19           systems data relating to the occurrence of the events for which each of the  
20           plurality of client systems requested notification;

21           an act of using a connectionless protocol to send separately stored  
22           data to one of the plurality of client systems in order to attempt to  
23           simultaneously notify the one of the plurality of client systems of the  
24           occurrence of all the events for which the one of the plurality of clients has

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1 27. In a network system including a server system and a client system, wherein  
2 the server system monitors the occurrence of events, sends notification to the client system  
3 when one of the monitored events occurs, and may have client data requiring transmission  
4 to the client system, a method for efficiently notifying applications associated with the  
5 client system when an event has occurred so as to preserve the processing capacity of  
6 server system and the client system, and so as to preserve bandwidth on the network  
7 system, the method comprising:

8           an act of the client system determining that one or more of a plurality of  
9           applications associated with the client system requesting notification of an  
10          occurrence of an event;

11           an act of the client system receiving one notification from the server system  
12          using a connectionless protocol notifying the client system that the event the one or  
13          more of the of the plurality of applications requested notification of occurred;

14           an act of the client system transmitting the received notification to the one  
15          ore more of the plurality of applications; and

16           an act of the client system attempting to create a connection using a  
17          connection-oriented protocol and receive client data associated with the one or  
18          more of the plurality of applications over the connection.

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3 28. A method as recited in claim 27 wherein the server system monitoring for  
4 the occurrence of events comprises executing separate modules to monitor individual  
5 events.

6 29. A method as recited in claim 27 wherein the act of the client system  
7 determining that one or more of a plurality of applications associated with the client  
8 system requested notification of the event comprises a module to detect the one or more of  
9 a plurality of applications.

10  
11 30. A method as recited in claim 29 wherein the act of transmitting the received  
12 notification to one or more of the plurality of applications comprises the module  
13 transmitting the received notification.

14  
15 31. A method as recited in claim 27 wherein the connectionless protocol is the  
16 User Datagram Protocol.

17  
18 32. A method as recited in claim 27 wherein the connection oriented protocol is  
19 Transmission Control Protocol.

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1           33. In a network system including a server system and a client system, wherein  
2 the server system monitors the occurrence of events, sends notification to the client system  
3 when one of the monitored events occurs, and may have client data requiring transmission  
4 to the client system, a method for efficiently notifying applications associated with the  
5 client system when an event has occurred so as to preserve the processing capacity of  
6 server system and the client system, and so as to preserve bandwidth on the network  
7 system, the method comprising:

8                 an act of the client system determining that one or more of a plurality of  
9 applications associated with the client system requesting notification of an  
10 occurrence of an event;

11                 a step for the client system to distribute a received notification to the one or  
12 more of the plurality of applications, the notification indicating that the event  
13 occurred; and

14                 an act of the client system attempting to create a connection using a  
15 connection-oriented protocol and receive client data associated with the one or  
16 more of the plurality of applications over the connection.

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34. A computer product claim for implementing, in a network system including a server system and a client system, wherein the server system monitors the occurrence of events, sends notification to the client system when one of the monitored events occurs, and may have client data requiring transmission to the client system, a method for efficiently notifying applications associated with the client system when an event has occurred so as to preserve the processing capacity of server system and the client system, and so as to preserve bandwidth on the network system, the computer product comprising:

    a computer-readable medium carry computer executable-instructions that, when executed at the client computer, cause the client computer to perform the following:

        an act of determining that one or more of a plurality of applications associated with the client system has requested notification of the occurrence of an event;

        an act of receiving one notification from the server system using a connectionless protocol notifying the client system that the event the one or more of the of the plurality of applications requested notification of occurred;

        an act of transmitting the received notification to the one or more of the plurality of applications; and

        an act of attempting to create a connection using a connection-oriented protocol and receive client data associated with the one or more of the plurality of applications over the connection.

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1           35. A computer product claim for implementing, in a network system including  
2 a server system and a client system, wherein the server system monitors the occurrence of  
3 events, sends notification to the client system when one of the monitored events occurs,  
4 and may have client data requiring transmission to the client system, a method for  
5 efficiently notifying applications associated with the client system when an event has  
6 occurred so as to preserve the processing capacity of server system and the client system,  
7 and so as to preserve bandwidth on the network system, the computer product comprising:

8                 a computer-readable medium carry computer executable-instructions that,  
9 when executed at the client computer, cause the client computer to perform the  
10 following:

11                     an act of determining that one or more of a plurality of applications  
12 associated with the client system has requested notification of the  
13 occurrence of an event;

14                     a step for distributing a received notification to the one or more of  
15 the plurality of applications, the notification indicating that the event  
16 occurred; and

17                     an act of attempting to create a connection using a connection-  
18 oriented protocol and receive client data associated with the one or more of  
19 the plurality of applications over the connection.